west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3105
Plant ID No.:	043-00011
Applicant:	Columbia Gas Transmission LLC (Columbia)
Facility Name:	Nye Compressor Station
Location:	Nye, Lincoln County
SIC Code:	4922
NAICS Code:	486210
Application Type:	"After the Fact" Construction
Received Date:	July 23, 2013 (Application Resubmittal – November 7, 2013)
Engineer Assigned:	Jerry Williams, P.E.
Fee Amount:	$3,500
Date Received:	July 23, 2013 ($1,000), August 29, 2013 ($2,500)
Complete Date:	November 15, 2013
Due Date:	February 13, 2014
Applicant Ad Date:	August 12, 2013
Newspaper:	*The Charleston Gazette*
UTM's:	Easting: 408.27 km Northing: 4,243.75 km Zone: 17
Description:	Establish emission limits of two (2) existing engines with updated stack test information.

PROJECT OVERVIEW

Nye Compressor Station compresses and dehydrates production gas upstream of a natural gas liquids (NGL) plant that is located near Columbia's Kenova Compressor Station. The station was installed in 1972, and no air permitting was required at that time. During the initial evaluation of Title V permitting applicability in 1996, Nye Compressor Station was determined to not be subject to Title V permitting requirements based on the emission factors in the October 1996 version of AP-42 Section 3.2. WVDEP questioned whether different, higher emission factors may be more appropriate for calculating the potential to emit (PTE) for the two (2) compressor engines. Columbia has submitted this permit application with recent stack test data to establish emission limits for the two (2) engines in question. These limits will establish this station to be below Title V permitting thresholds.

DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-3105:

Significant emission units currently at the station include two (2) natural gas fueled 300 hp Waukesha L3711G engines (CE-1, CE-2) and a natural gas dehydration system (RB-1, RSV-1) with a design rated natural gas throughput of 5 million standard cubic feet per day (mmscfd) and an associated 0.155 MMBTU/hr reboiler. In addition, there are six (6) tanks that store pipeline liquids, new and used engine lube oil, and glycol. Pipeline liquids are loaded into tank trucks for transport offsite approximately once per quarter. The glycol dehydration system has a design rated capacity of 5.0 million standard cubic feet per day, but actual throughput is typically between 1.6 and 2.6 mmscfd.

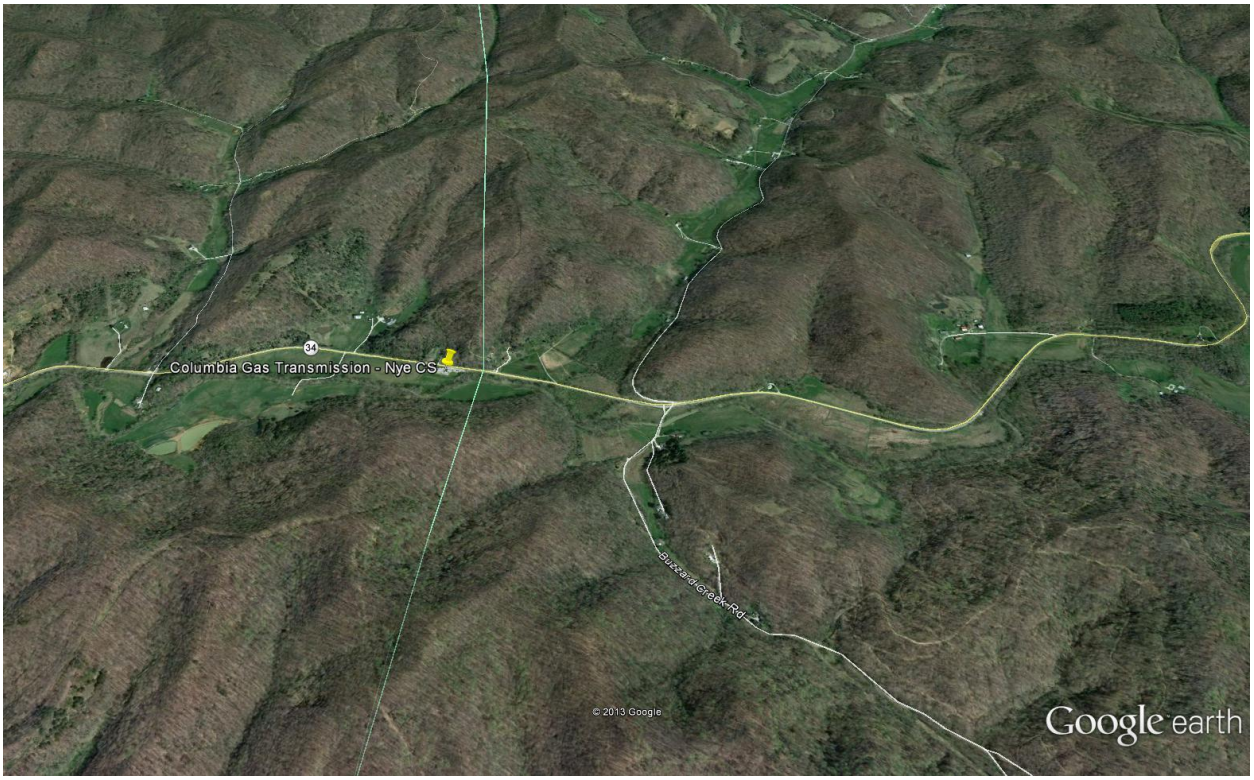
One (1) TEG dehydrator (RSV-1) and associated reboiler (RB-1) will be utilized at the facility. The dehydrator is used to remove water vapor from the inlet wet gas stream to meet pipeline specifications. In the dehydration process, the wet inlet gas stream flows through a contactor tower where the gas is contacted with lean glycol. The lean glycol absorbs the water in the gas stream and becomes rich glycol laden with water and trace amounts of hydrocarbons. The rich glycol is sent to the regenerator where the glycol is heated to drive off the water vapor and any remaining hydrocarbons. Once through the reboiler, the glycol is returned to a lean state and used again in the process.

Fugitive emissions from pipe leaks will also occur at the facility.

SITE INSPECTION

A site inspection was conducted by Dan Bauerle of the DAQ Enforcement Section on June 15, 2012. As a result of this inspection, Mr. Bauerle discovered that Columbia had not necessarily used the appropriate emission factors in making their Title V applicability determination. Columbia conducted a performance test for CO and NO_x on November 13, 2012 in an effort to establish minor source emission levels for these pollutants. This permitting action is a result of these findings.

Latitude: 38.337239
Longitude: -82.044403



ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this "after the fact" construction application consist of the combustion emissions from two (2) natural gas fired compressor engines (CE-1, CE-2), one TEG dehydrator reboiler (RB-1), one (1) TEG dehydrator still vent (RSV-1), two (2) lube oil tank (T01, T05), three (3) pipeline liquids storage tank (T02-T04), one (1) TEG tank (T06), one (1) truck loadout (L-1), and fugitive piping emissions (FUG). Fugitive emissions for the facility are based on calculation methodologies presented in EPA Protocol for Equipment Leak Emission Estimates. The following table indicates which methodology was used in the emissions determination:

Emission Unit ID#	Process Equipment	Calculation Methodology
CE-1, CE-2	300 hp Waukesha L3711G Reciprocating Internal Combustion Engine (RICE)	Performance Test Data, Manufacturer's Data, EPA AP-42 Emission Factors
RB-1	0.155 MMBtu/hr TEG Dehydrator Reboiler	EPA AP-42 Emission Factors
RSV-1	5.0 mmscfd TEG Dehydrator Still Vent	GRI-GlyCalc 4.0
T01, T05	Lube Oil Storage Tanks (1,150 gal, 1,574 gal)	EPA Tanks 4.09
T02-T04	Pipeline Liquids Storage Tanks (500 gal, 190 gal, 5,000 gal)	EPA Tanks 4.09, VBE
T06	Glycol TEG Storage Tank (470 gal)	EPA Tanks 4.09
L-1	Truck Loadout Rack (5,000 gal/day)	EPA AP-42 Emission Factors
FUG	Process Piping Fugitive Emissions	EPA AP-42 Emission Factors

The total facility PTE for the Nye Compressor Station is shown in the following table:

Pollutant	Facility Wide PTE (tons/year)
Nitrogen Oxides	38.61
Carbon Monoxide	24.16
Volatile Organic Compounds	57.14
Particulate Matter-10	0.22
Sulfur Dioxide	0.02
Formaldehyde	0.46
Total HAPs	9.30
Carbon Dioxide Equivalents	15,636

Maximum detailed controlled point source emissions were calculated by Columbia and checked for accuracy by the writer and are summarized in the table on the next page. In regards to greenhouse gases (GHG), the Carbon Dioxide Equivalent (CO_2e) emissions were based on EPA emission factors for the engines (CE-1, CE-2), reboiler, and fugitive emissions.

Columbia Gas Transmission, LLC – Nye Compressor Station (R13-3105)

Emission	Source	NO_x		CO		VOC		PM 10/2.5		SO_2		Formaldehyde		Total HAPs		CO_2e	
Unit ID#		lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year
CE-1	Waukesha Engine	4.40	19.27	2.75	12.05	0.02	0.10	0.03	0.11	0.21	0.01	0.06	0.23	0.09	0.36	298	1305
CE-2	Waukesha Engine	4.40	19.27	2.75	12.05	0.02	0.10	0.03	0.11	0.21	0.01	0.06	0.23	0.09	0.36	298	1305
RB-1	Dehydrator Reboiler	0.02	0.07	0.02	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	18	79
RSV-1	Dehydrator Still Vent	-	-	-	-	10.50	46.12	-	-	-	-	-	-	1.88	8.23	-	-
T01	Lube Oil Tank	-	-	-	-	<0.01*	0.01	-	-	-	-	-	-	<0.01	<0.01	-	-
T02	Pipeline Liquids Tank	-	-	-	-	4.88*	0.12	-	-	-	-	-	-	0.33	0.01	-	-
T03	Pipeline Liquids Tank	-	-	-	-	1.09*	0.03	-	-	-	-	-	-	0.07	0.01	-	-
T04	Pipeline Liquids Tank	-	-	-	-	183*	4.69	-	-	-	-	-	-	12.62	0.32	-	-
T05	Lube Oil Tank	-	-	-	-	3.05*	0.07	-	-	-	-	-	-	<0.01	<0.01	-	-
T06	Glycol TEG Tank	-	-	-	-	<0.01*	<0.01	-	-	-	-	-	-	<0.01	<0.01	-	-
L-1	Truck Loading	-	-	-	-	62.06*	0.16	-	-	-	-	-	-	4.15	0.01	-	-
FUG	Fugitive Pipe Leaks	-	-	-	-	NA	4.44	-	-	-	-	-	-	NA	<0.01	NA	12871
FUG	Station Blowdowns	-	-	-	-	NA	1.30	-	-	-	-	-	-	<0.01	<0.01	NA	76
Total	**Total Facility PTE**	**8.82**	**38.61**	**5.52**	**24.16**	**264.62 ***	**57.14**	**0.06**	**0.22**	**0.42**	**0.02**	**0.12**	**0.46**	**19.23**	**9.30**	**614**	**15636**

* - Hourly VOC emissions from tanks and truck loading are short term and intermittent

REGULATORY APPLICABILITY

The following rules apply to the facility:

45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

The purpose of 45CSR2 is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units. 45CSR2 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 4 (weight emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The individual heat input of the proposed reboiler (RB-1) is below 10 MMBTU/hr. Therefore, this unit is exempt from the aforementioned sections of 45CSR2.

Columbia would also be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

45CSR4 (To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors)

45CSR4 states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. No odors have been deemed objectionable.

45CSR10 (To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides)

The purpose of 45CSR10 is to establish emission limitations for sulfur dioxide which are discharged from fuel burning units. 45CSR10 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 3 (weight emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The individual heat input of the proposed reboiler (RB-1) is below 10 MMBTU/hr. Therefore, this unit is exempt from the aforementioned sections of 45CSR10.

45CSR13 (Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation)

45CSR13 applies to this source due to the fact that Columbia exceeds the regulatory emission threshold for criteria pollutants of 6 lb/hr and 10 ton/year, and they are also subject to a substantive requirement of an emission control rule promulgated by the Secretary (40CFR63 Subparts HH and ZZZZ).

Columbia paid the appropriate application fee and published the required legal advertisement for a construction permit application.

45CSR22 (Air Quality Management Fee Program)

Columbia is not subject to 45CSR30. Columbia is required to pay the appropriate annual fees and keep their Certificate to Operate current.

40CFR63 Subpart HH (National Emission Standards for Hazardous Air Pollutants for Oil and Natural Gas Production Facilities)

Subpart HH establishes national emission limitations and operating limitations for HAPs emitted from oil and natural gas production facilities located at major and area sources of HAP emissions. The glycol dehydration unit at the Nye Compressor Station is subject to the area source requirements for glycol dehydration units. However, because the facility is an area source of HAP emissions and the actual annual average flowarate of natural gas is less than 85,000 standard cubic meters (3 million cubic feet) per day, and the actual average benzene emissions from the glycol dehydration unit is below 0.90 megagram per year (1.0 tons/year) Columbia is not subject to the glycol dehydration vent standards in 40 CFR 63.765. Columbia is required to maintain records of either actual average flowrate of natural gas and actual annual average of benzene emissions to demonstrate a continuous exemption status.

40CFR63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines)

Subpart ZZZZ establishes national emission limitations and operating limitations for HAPs emitted from stationary RICE located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations. The Nye Compressor Station is subject to the area source requirements for non-emergency spark ignition engines.

The 300 hp Waukesha L3711G RICEs (CE-1, CE-2) were manufactured in 1972. This would classify these RICEs as "existing" RICEs because they commenced construction before June 12, 2006 (§63.6590 (a)(1)(iii)). The RICEs must comply with the applicable emission limitations, operating limitations, and other requirements no later than October 19, 2013. Columbia must comply with the requirements in Table 2d to this subpart and

the applicable operating limitations in Table 2b to this subpart. However, the proposed engine does not have any applicable requirements under Table 2b.

Table 2d requires Columbia to do the following:

For each . . .	You must meet the following requirement, except during periods of startup . . .
Non-emergency, non-black start 4SRB stationary RICE ≤500 HP	a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[1]
	b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and
	c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

The following rules do not apply to the facility:

45CSR30 (Requirements for Operating Permits)

Columbia is a minor source and not subject to 45CSR30.

40CFR60 Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units)

This rule applies to steam generating units with a heat input capacity of 100 MMBTU/hr or less, but greater than or equal to 10 MMBTU/hr for which construction commenced after June 9, 1989. Columbia does not have an applicable unit, therefore, Columbia would not be subject to this rule.

40CFR60 Subpart Kb (Standards of Performance for Volatile Organic Liquid Storage Vessels)

40CFR60 Subpart Kb does not apply to storage vessels with a capacity less than 75 cubic meters. The largest tanks that Columbia has proposed to install are 18.93 cubic meters each. Therefore, Columbia would not be subject to this rule.

40CFR60 Subpart KKK (Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants)

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984, and on or before August 23, 2011. The Nye Compressor Station is not a natural gas processing facility, therefore, Columbia is not subject to this rule.

40CFR60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE))

40CFR60 Subpart JJJJ establishes emission standards for applicable SI ICE.

The 300 hp Waukesha L3711G RICEs (CE-1, CE-2) was manufactured in 1972 which is prior to the July 1, 2008 applicability date for engines with a maximum power less than 500 hp. Therefore, Columbia would not be subject to this rule.

40CFR60 Subpart OOOO (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution)

EPA published in the Federal Register new source performance standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. 40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO_2) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011. None of the equipment at the Nye Compressor Station commenced construction, modification or reconstruction after August 23, 2011, therefore, Columbia is not subject to this rule.

45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

The Nye Compressor Station is located in Lincoln County, which is classified as an attainment county for all pollutants, therefore it is not subject to 45CSR19.

As shown in the table below, Columbia is not subject to 45CSR14 or 45CSR19 review.

Pollutant	**PSD (45CSR14) Threshold (tpy)**	**NANSR (45CSR19) Threshold (tpy)**	**Nye PTE (tpy)**	**45CSR14 or 45CSR19 Review Required?**
Carbon Monoxide	250	NA	24.16	No
Nitrogen Oxides	250	NA	38.61	No
Sulfur Dioxide	250	NA	0.02	No
Particulate Matter 10	250	NA	0.22	No
Ozone (VOC)	250	NA	57.14	No
Greenhouse Gas	100,000	NA	15,636	No

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There will be small amounts of various non-criteria regulated pollutants emitted from the combustion of natural gas. However, due to the concentrations emitted, detailed toxicological information is not included in this evaluation.

AIR QUALITY IMPACT ANALYSIS

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) or 45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment) as seen in the table listed in the Regulatory Discussion section under 45CSR14/45CSR19.

SOURCE AGGREGATION DETERMINATION

"Building, structure, facility, or installation" is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

1. The Nye Compressor Station will operate under SIC code 1389 (Oil and Gas Field Services, Not Classified Elsewhere). The upstream gas production wells will operate under SIC code 1311 (Crude Petroleum and Natural Gas). Therefore, both share the same two-digit major SIC code of 13. Therefore, the two (2) entities do belong to the same industrial grouping.

2. Columbia operates the Nye Compressor Station as a gathering station and the facilities upstream of the station are production facilities (gas wells) that are owned and operated by companies other than Columbia. The natural gas liquid plant that is downstream of the Nye Compressor Station is also owned and operated by a company other than Columbia. Columbia has no ownership stake in any production well that may send natural gas to the Nye Compressor Station. In addition, no work forces are shared between the two (2) companies. The producers are and will be responsible for any decisions to produce or shut-in wellhead facilities and no control over the equipment installed, owned, and operated by Columbia. Therefore, these facilities are not under common control.

3. The closest Columbia facility to the Nye Compressor Station is the Hubball Compressor Station which is twelve (12) miles away. Operations separated by these distances are not considered contiguous or adjacent.

The Nye Compressor Station and the surrounding production wells share the same industrial grouping. However, the two (2) facilities are not under common control, and they are not located on contiguous or adjacent properties. Therefore, the emissions from these two (2) facilities should not be aggregated in determining major source or PSD status.

MONITORING OF OPERATIONS

Columbia will be required to perform the following monitoring and recordkeeping:

- Monitor and record quantity of natural gas consumed and hours of operation for all combustion sources.
- Maintain records of testing conducted in accordance with the permit.
- Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
- Maintain records of the visible emission opacity tests conducted per the permit.
- Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engine and ancillary equipment.
- Maintain records of all applicable requirements of 40CFR63 Subpart ZZZZ.
- The records shall be maintained on site or in a readily available off-site location maintained by Columbia for a period of five (5) years.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that Columbia meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Nye Compressor Station should be granted a 45CSR13 "after the fact" construction permit for their facility.

_____
Jerry Williams, P.E.
Engineer

_____
Date